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## NOTES ON NORTH AMERICAN CHERNETIDÆ.

BY NATHAN BANKS, ITHACA, N. Y.

The North American genera of *Chernetidæ*, so far as recognized, may be separated by the following table:—

1	Cephalothorax with a transverse suture; mandibles small ( <i>Cheliferinæ</i> ).....	2
	Cephalothorax without a transverse suture; mandibles larger ( <i>Obisinæ</i> ).....	3
2	Four eyes.....	<i>Garypus</i>
	Two eyes.....	<i>Chelifer</i>
	No eyes.....	<i>Chelanops</i>
3	Mandibles with apophysis or stylet.....	5
	Mandibles without apophysis.....	4
4	Fingers straight; cephalothorax wider in front than behind .....	<i>Chthonius</i>
	Fingers curved; cephalothorax narrower in front than behind .....	<i>Obisium</i>
5	Eyes inconspicuous or absent.....	<i>Atemnus</i>
	Four distinct eyes.....	<i>Olpium</i>

The two subfamilies may, I believe, be farther separated by the fact that the *Cheliferinæ* have the dorsal scutæ of the abdomen divided by a median line; while in the *Obisinæ* the scutæ are entire. *Chernes pallidus*, Banks, which was described as having the median line wanting, really has a median line, though on account of the light colour of the abdomen it is very difficult to trace. The *Cheliferinæ* have an apophysis or small stylet near the end of the mandibular finger. In the more typical *Obisinæ* this is lacking, but in *Atemnus* and *Olpium* it is present. Clubbed hairs are frequently present in the *Cheliferinæ*, while they are not found in our forms of *Obisinæ*.

*Chelifer*, Geoff.

In this genus the palpi are usually much longer than in *Chelanops*. A new species from Florida may be called

*Chelifer floridanus*, nov. sp.

Length, 2.3 mm. Colour, dark reddish brown; palpi very long, second joint with a swollen projection behind bearing two spinous processes; third joint (femur) very slender, with the pedicel somewhat distinct, twice as long as the cephalothorax is broad at anterior furrow; fourth joint a little shorter than the preceding one, very much larger at the tip than at base; claw not near as long as second and third joints together; hand not broad, fingers not much longer than hand; palpi, except fingers, with clubbed hairs. Cephalothorax granulated, with larger rounded bodies scattered over its surface; a few spines on each side. Abdomen about twice the length of the cephalothorax, widest behind the middle; lateral ends of the scutæ projecting behind and pointed; scutæ separated by a narrow line, wider behind; body with clubbed hairs. The palpi are very much longer and slenderer than in any other described American form; the tip of the fourth joint reaches much beyond the end of the abdomen. Southern Florida, E. A. Schwarz. A peculiar form from Texas may be called

*Chelifer texanus*, nov. sp.

Length, 2.5 mm. Colour, abdomen and legs whitish or yellowish; dorsal scutæ brownish yellow; cephalothorax and palpi reddish, not very dark. Palpi short; second joint gibbous behind, with a longer pedicel than usual; third joint distinctly pedicellate, inner margin nearly straight, outer margin convex, not over twice the length of the second; fourth pedicellate, a little shorter and larger than the preceding, inner margin strongly convex, outer margin slightly so; hand oblong oval, not very broad, and longer than the fingers. Palpi furnished with very small and delicate clubbed hairs, except on the fingers. Cephalothorax tapering and rounded in front, with delicate clubbed hairs, no spines, no larger granules. Abdomen oblong, dorsal scutæ narrowly separated by a line, with both clubbed and simple hairs.

In some points of structure this species resembles a *Chelanops* more than a *Chelifer*, but the eyes are well developed; the palpi are shorter than usual in *Chelifer*, and the dorsal scutæ do not cover the abdomen as completely as in most *Chelifers*. Brazos Co., Texas.

*Chelanops (Chernes).*

As shown by Simon *Chernes*, Menge is *Chelanops*, Nicolet. A new species from Long Island may be described as follows :—

*Chelanops tristis*, nov. sp.

Length 2. mm. Colour pale reddish-yellow, soft parts white. Second joint of palpi with two projections behind ; third joint pedicellate, nearly cylindrical, twice as long as second ; fourth scarcely shorter than the third, pedicellate, inner margin very convex ; hand, pedicellate, broad, inner margin very convex, outer but slightly so ; fingers as long as hand, curved ; whole palpi furnished with only simple hairs. Body with simple hairs and a few somewhat clubbed ones near the anterior part of the cephalothorax. Legs nearly white. Abdomen oblong oval, dorsal scutæ widely separated, the dark spot much nearer the inner than the outer end. On the sea shore of Long Island, New York.

The described species of *Chelanops* may be separated by the following table :—

1	{ Palpi with clubbed hairs.....	2
	{ Palpi with only simple hairs.....	3
2	{ Palpi as long as body, large, very pale.....	<i>pallidus</i> .
	{ Palpi not as long as body, small, dark.....	<i>sanborni</i> .
3	{ Fingers almost one-half shorter than hand.....	<i>acuminatus</i> .
	{ Fingers as long or scarcely shorter than the hand.....	4
4	{ Dark spots in dorsal scutæ much nearer median than lateral end, scutæ widely separated.....	<i>tristis</i> .
	{ Dark spots at about the middle of dorsal scutæ, scutæ narrowly separated.....	<i>oblongus</i> .

*Garypus*, Koch.

In this genus the cephalothorax is quite suddenly narrowed in front of the eyes. It has not been recorded from the U. S. Several specimens of a species of this genus were found at Ithaca, N. Y., in the crevices of a rocky cliff. The form may be described as follows :—

*Grypus granulatus*, nov. sp.

Length, 1.7 mm.; colour, abdomen yellowish, legs white, palpi and cephalothorax pale reddish. Palpi longer than the body ; second joint short, very convex in front ; third not very long, short pedicellate, gradually growing thicker ; fourth pedicellate, shorter than the preceding,

becoming near end a little larger than the femur; claw about as long as femur; hand not very broad, tapering towards base of fingers, which are a little shorter than the hand, and curved. Palpi, except fingers, granulated, and provided with simple hairs. Cephalothorax distinctly narrowed in front of eyes, anterior margin straight. Abdomen broad, seven scutæ separated by a line, first scuta not divided. Legs short, hind legs not very stout. Cephalothorax and scutæ of abdomen granulated, with simple hairs. The eyes slightly projecting and almost touching. Legs granulated, hind pairs but little larger than front pairs. Found in crevices of a cliff at Ithaca, N. Y.

*Chthonius*, Koch.

The species of this genus are seldom taken in houses. They are not rare under wet or damp leaves in the woods. They can move quite rapidly. Three species have been described from the U. S., two of them from caves. The description given by Hagen for *Chth. pennsylvanicus* was quite short. A fuller description of this and two other forms may be added.

*Chthonius pennsylvanicus*, Hagen.

Length, 1.9 mm. Colour, brownish with scattered silvery spots on abdomen, mandibles reddish, palpi pale reddish, legs white. Palpi slender, longer than the body; third joint (femur) reaching one-third its length beyond the cephalothorax, nearly cylindrical, slightly narrowed in middle, largest near tip; fourth joint about one-third the length of the third joint; hand not broad, tapering towards base of fingers, the latter straight about one and one-half times length of hand; femur longer than fingers. Mandibles very large, about as long as cephalothorax. Cephalothorax much wider in front than behind, about as wide in front as long. Hind eye about twice its diameter from front eye, which is about on the front margin. Abdomen narrow at base, becoming broader near tip, twice as long as cephalothorax. Hind pairs of legs very much larger than front pairs; fourth pair much longer than body, tip of femur nearly reaching to the end of abdomen. Penn., N. Y.

*Chthonius longipalpis*, nov. sp.

Length, 1.9 mm. Colour pale yellowish, fingers and claws of mandibles a little reddish; cephalothorax and scutæ slightly brownish, abdomen with scattered silvery spots. Palpi long and slender, longer than body; femur very slender, slightly largest near tip; fourth joint short, conical; claw slender; hand narrow, tapering toward base of fingers,

which are straight and a little longer than hand; femur longer than fingers. Mandibles large, not quite as long as cephalothorax. Cephalothorax not much wider in front than behind, not near as much so as in *Chth. pennsylvanicus*; hind eye about once or one and one-fourth its diameter from front eye, which is a little separated from anterior margin of cephalothorax. Abdomen narrow at base, growing wider near tip, end rounded, more than twice the length of the cephalothorax. Hind pairs of legs larger than front pairs; hind legs extending beyond abdomen, but the tip of the tibiae rarely reach the end of the abdomen. Under leaves in woods, Long Island, N. Y.; Ithaca, N. Y.; Washington, D. C.

*Chthonius moestus*, nov. sp

Length, 1.3 mm. Colour, more reddish than preceding, silvery spots not as distinct. Palpi short not reaching end of abdomen; femur short, cylindrical; fourth joint conical; hand very short, fingers straight, about twice the length of hand, about as long as femur. Mandibles large, tapering, not as long as cephalothorax. Cephalothorax quite a little broader in front than behind, more so than in *Chth. longipalpis*; eyes close together, about touching. Hind pair of legs short, not reaching beyond abdomen. Ithaca, N. Y., under stones in spring.

The described species of North American *Chthonius* may be separated by the following table:—

1	{ Cave species, two or no eyes .....	2
	{ Not cave species, four eyes .....	3
2	{ Hind legs about twice as long as the abdomen.....	<i>packardi</i> .
	{ Hind legs not much longer than the abdomen.....	<i>coecus</i> .
3	{ Eyes close together, almost touching.....	<i>moestus</i> .
	{ Eyes distinctly separated.....	4
4	{ Hind eyes about twice its diameter from front eye, ceph. much wider in front than behind.....	<i>pennsylvanicus</i>
	{ Hind eye not twice its diameter from front eye, ceph. but little wider in front than behind..	<i>longipalpis</i> .

*Atemnus*, Can.

The eyes in this genus are indistinct or wanting; the mandibular apophysis is present, the dorsal scutæ softer than usual, and the fourth joint of the palpi is longer than is usual in the *Obisinae*. A species from California may be called

*Atemnus californicus*, nov. sp.

Length, 2.1 mm. Colour, cephalothorax and palpi reddish-yellow, abdomen and legs nearly white. Cephalothorax longer than broad, sides

nearly parallel until just before the anterior margin where they converge slightly, anterior margin very obtusely angled. Mandibles about half the length of cephalothorax, finger with a small and weak apophysis. No eyes. Cephalothorax smooth. Palpi very long; the basal joint narrower than usual; second joint slender, as long as mandibles, a very small, conical projection on outer side near distal end; third joint (femur) slender, nearly as long as cephalothorax and mandibles together, not pedicellate, gradually growing thicker from the base; fourth joint a little shorter than the third, very long pedicellate, pedicel almost one-third the length of the joint, gradually growing thicker, both sides convex, the outer more convex toward the distal end, the inner more convex toward basal end, broader than femur; hand quite long pedicellate, oblong oval, not very broad; fingers much longer than hand, curved toward the tip, with a great many very fine teeth; inner side of femur and inner side of hand and base of fingers granulated. Body and appendages with simple hairs. Abdomen wider than cephalothorax, widest behind the middle, not very long; hind legs long, reaching much behind the abdomen, other legs a little longer than usual. California, Dr. Cooper Curtice.

*Olpium*, Koch.

This genus is related to *Atemnus*, but has distinct eyes. It has not been recorded from U. S. A species from the District of Columbia may be called

*Olpium rufulum*, nov. sp.

Length, 2.5 mm. Colour, cephalothorax and palpi red, dorsal scutæ yellowish, legs white, venter yellowish. Palpi slightly longer than the body, second joint with a small obtuse projection behind; third joint (femur) pedicellate, about as long as cephalothorax, nearly cylindrical; fourth joint shorter, long pedicellate, both sides convex, inner side more convex toward base; hand pedicellate, nearly as long as fourth joint, not very broad, tapering slightly toward base of fingers; fingers curved, as long as hand; femur and part of hand finely granulate. Cephalothorax smooth, one and one-half times as long as broad, sides nearly parallel, slightly contracted in front of eyes, anterior margin a little convex; eyes close together, anterior eye about its diameter from anterior margin; mandibles not one-half the length of cephalothorax, apophysis slender. Abdomen about one and three-fourths the length of cephalothorax, not much wider, widest in middle; fourth pair of legs about reaching end of abdomen. Body and appendages with long simple hairs.

Under a large stone, Washington, D. C., March.

ADDITIONS TO THE CANADIAN LIST OF MICRO-  
LEPIDOPTERA.

BY J. ALSTON MOFFAT, LONDON, ONT.

As I was in the habit of sending to the authorities, for determination, only such as I had in duplicate, thereby avoiding the inconvenience of returning them, and retaining single specimens of a kind as a reminder of what to look for, and in most cases where to look for them, I found that in Micros single specimens accumulated rapidly. Having changed my location, I wished to finish up with the old material and begin anew. So as a means toward that end, I sent to Prof. C. H. Fernald 80 specimens that I had been unable to identify, with the understanding that he was to retain such of them as he desired. I regret that there seems to have been so little of value to him amongst them, as evidenced by the few that he did retain, to reward him for the time, trouble and thought that he must have expended on them, which is mildly disclosed in the remark appended to the list of names that he sent to me, "They are an interesting but difficult lot."

As was to be expected in such an accumulation, some turned out to be variations of old forms, others merely better specimens of some already known by name, whilst others were so poor as to render them unfit for determination; and some proved to be partially or wholly unknown to him. After discarding all pronounced too poor to determine, and placing in position those already known, we have the following 30 names added to our list, and their representatives to the Society's collection (excepting one):—

*Botis oscitalis*, Grote.

" *manalis*, Led. "

*Hydrocampa proprialis*, Fern.

*Lipocosma fuliginosalis*, Fern.

*Homophysa glaphyralis*, Guen.

*Toripalpus lunulalis*, Hulst.

*Acrobasis palliolella*, Ragonot.

*Ambesa walsinghami*, Rag.

*Euzophora semifuneralis*, Walk.

*Canarsia hammondi*, Riley.

*Peoria hæmatica*, Zell.



- Teras effractana*, Frol.  
" *hastiana*, Linn.  
*Lophoderus afflictatus*, Wlsm.  
*Idiographis inopiana*, Haw.  
*Eccopsis atrodentana*, Fern.  
" *malana*, Fern.  
*Sericoris instrutana*, Clem.  
*Pædisca junciciliana*, Wlsm.  
" *abbreviatana*, Wlsm.  
" *solicitana*, Walk.  
*Semasia ferruginana*, Fern.  
" *argutana*, Clem.  
*Proteoteras æsculana*, Riley.  
*Phoxopteris subæquana*, Zell.  
*Mellisopus latiferreana*, Wlsm.  
*Dichrorampha incanana*, Clem.  
*Cryptolochia querciella*.  
*Gelechia purpureofusca*, Walk.  
" *inscripta*, Wlsm.

Then there are besides, one species of *Lophoderus* undetermined; three *Eccopsis*, three *Semasias*, two *Phycids*, three *Pædiscas*, and one *Penthina*, with eleven where the genera was uncertain or unknown.

Amongst the old names received is *Sericoris coruscana* and *constellatana*. *Coruscana* is in the Society's printed list; *constellatana* was first published as Canadian, so far as I know, in Mr. H. S. Saunders's list of captures at electric light in 1886. CAN. ENT., Vol. XIX., No. 2. It is a common and abundant species wherever I have collected, in its season, and tolerably constant, varying slightly in depth of shading. I have seen both names in collections when I have thought it looked like two names for one species. I had a specimen that differed somewhat from the ordinary in the markings; I put it in the box, and that is how I got the name at this time. Prof. Fernald detected two specimens of *coruscana* in this lot. It is distinctly different from the other and must have been very rare where I have collected, as it was wholly unknown to me; so that it seems extremely probable that the name on the Society's list should have been *constellatana*, instead of *coruscana*, and Canadian collectors would do well to take note of it.



## NEW NORTH AMERICAN HOMOPTERA.—III.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

✓ *Lamenia Californica*, n. sp.

Form and size of *L. vulgaris*. Black, shining, densely pruinose; head, pectoral pieces, and legs fulvous. Length, 4 mm.

Front but little wider across the middle than next the vertex. Head fulvous, tinged with brown on the vertex, apex of the clypeus, margins of the cheeks, and on the front each side of the central carina. Eyes dark brown. Pronotum fulvous, more or less embrowned on the disc; propleura, base of the intermediate femora and the claws dusky or blackish. Elytra as in *vulgaris*, blackish with a row of fine white lines on the transverse nervures at the base of the apical areoles. Plates of the male concave on their inner edges, touching at base and apex only.

This species is very near our eastern *vulgaris* from which it may be distinguished by its fulvous head, pronotum, and pectus, and the form of the plates of the male. In *vulgaris* these are slightly retreating on their inner margins at base, and near the middle exhibit a distinct re-entrant angle.

Los Angeles, California. Described from six examples, all males, received from Mr. D. W. Coquillett. (Nos. 642 and 643.)

✓ *Cicadula punctifrons* var. *americana*, n. var.

This variety differs from the typical form as follows: Front deeper brown, scutellum with a black spot within the basal angles mostly covered by the pronotum which is there discoloured or marked with a brown cloud; two outer areoles on the clavus and the three inner on the corium blackish, appearing as five oblique blackish vittæ; apical areoles infuscated; nervures of the wings deep fuscous. Other markings and the genital characters as in the parent form.

The apparently constant differences between this and the typical form seem to call for a varietal name, but it could hardly be considered a distinct species. About Buffalo it occurs in great numbers on low willow bushes from June to August. I have taken one example that does not differ from typical European specimens in my collection. It occurred on osiers in company with the variety July 12th, 1889, but does not seem to be common.

✓ *Athysanus parallelus*, n. sp.

Closely allied to *A. striola*, Fall.; larger and stouter, vertex shorter;

pronotum shorter, its hind edge nearly straight. Colour and markings about as in that species. Length, 6 mm.

Head broad and short; vertex short, fore and hind margins parallel, but feebly arquated, width between the eyes three times the length, disc obscurely longitudinally rugose; face coarsely punctured; front moderately convex, its length and breadth subequal; clypeus oblong, sides straight, at apex slightly contracted; base feebly convex; loræ broad, rounded; outer edges of the cheeks scarcely angled below the eyes, apically margining the loræ and attaining the tip of the clypeus. Pronotum as long as the scutellum, broad anterior margin calloused, behind which is an arquated impressed line, hind edge feebly concave or almost straight. Elytra usually subhyaline, sometimes more or less infuscated toward the inner margin, nervures distinct.

Genital characters. Male: Valve slightly longer than the last ventral segment, broad, its apex rounded; plates broad, nearly square across their apex, outer angles rounded, inner edges contiguous nearly to their apex, a little shorter than the valve. Female: ultimate ventral segment a little longer than the penultimate, apical margin nearly straight, with a broad subtriangular central notch, not reaching the middle of the segment, extreme outer corners oblique; pygofer as in *striola*.

Colour yellow, pale on the face, pectus, legs, and disc of the pronotum. Front black, apex, median line and about six arcs on each side yellow; temples black marked with a yellow spot. Eyes, second joint of the antennæ, sutures of the face, median line of the clypeus, and front of the vertex black; ocelli fulvous, connected by a yellow band; posterior disc of the pronotum sometimes obscured. Elytra pale yellowish, inner and apical areoles sometimes smoky, nervures pale. Wings whitish hyaline, sometimes smoky toward their tips, nervures concolorous. Abdomen black; connexivum broadly, the genital and penultimate, and the margins of the ultimate segments, and sometimes the sides of the venter, yellow; sheath of the ovipositor black. In dark examples the outer surfaces of the femora are trilineate with black, and there is a black line on the edge of the anterior and intermediate tibiæ; tips of the tibiæ and tarsal joints embrowned.

Described from one male and seven female examples, all taken near South Falls, on the Muskoka River, Ont., about the first of August. This is the large form of *A. striola* mentioned in my list of Muskoka

Hemiptera, CAN. ENT. XXI., p 11, 1889. But a comparison of the genital characters with a series of *striola* received from Europe shows it to be a well marked species.

The true *striola* is common about Buffalo from July to September on swampy meadows and pasture lands.

✓*Goniagnathus Palmeri*, n. sp.

Form of *Pediopsis insignis*; short and broad, punctured, colour uniform deep shining black, tarsi and apical nervure of the elytra rufo-piceous. Length, 4 mm.

Head a little wider than the pronotum, closely punctured; vertex short, very little longer at the middle than next the eye, apex very obtusely angled, passage to the front well rounded; ocelli placed nearly half way from the eye to the apex of the forehead; front convex about one-sixth longer than wide, sides pretty regularly aruated, suddenly contracted at the apex, disc each side with a large smooth area crossed by about eight irregular rows of punctures; clypeus narrowed from its rounded base, (its apex?) loræ broad; cheeks broad, prominently angled a little below the eyes; antennæ small, incerted beneath a feeble oblique ledge. Pronotum long, almost semicircular in outline, latero-posterior margins long, hind margin moderately concave; surface coarsely punctured, irregularly so on the disc, anterior submargin with an interrupted transverse impunctured band across its whole width; narrow hind margin impunctured. Scutellum acute at apex; anterior field coarsely punctured, disc with a finely punctured area each side of the middle; posterior field transversely wrinkled, with a few scattering coarse punctures. Elytra but little longer than the abdomen, oblique at tip, thick and coraceous, smooth; all the areoles circumscribed by a single row of coarse punctures; apical areoles five, short, subequal; antiapicals three. Inner edge of the posterior femora somewhat expanded apically in a small rounded lobe; basal joint of the hind tarsi thickened. Abdomen stout, last ventral segment of the female longer than the preceding, its hind edge very feebly advanced in the middle; pygofer short, obtusely subtriangular in form, slightly exceeded by the ovipositor.

Colour a uniform deep shining black; apical nervure of the elytra, tarsi, base of the eyes beneath, and the antennal setæ, rufo-piceous.

Described from a single female example taken at Mt. Balsam, N. C., Aug. 1st, 1890, by my friend Mr. W. J. Palmer, jr., of this city, to whom I take pleasure in dedicating this singularly neat and elegant little species. This is certainly a notable addition to the homopterous fauna of this country. It is a remarkably trim compactly built little creature, mimicking very closely the genus *Pediopsis*, from which it differs, however, by all the characters separating that genus from the Jassidæ proper. In its intensely black colour it has few equals in our Jassid fauna. In mounting this specimen the apex of its clypeus was unfortunately covered so its characters cannot be given.

#### DESCRIPTIONS OF SOME BUTTERFLY LARVÆ FROM YOSEMITE.—I.

BY HARRISON G. DYAR, YOSEMITE, CAL.

##### *Limenitis lorquini*, Boisd.

*Egg*.—Nearly spherical, the base flat; covered with elevated reticulations from the intersections of which arise short spines. The depressions between the reticulations are rounded. Colour pale green with a silvery lustre. Diameter .9 mm. Laid singly at the extreme tip of a leaf on the upper surface.

*First larval stage*.—Head rounded, brown, not shiny; ocelli and jaws black; a few minute hairs arising from yellowish elevated bases; width .6 mm. Body slightly enlarged at joint 12; feet normal. Colour yellowish, with rows of short conical tubercles, which are largest dorsally on joints 3, 4, 6 and 12; some very short and minute hairs. The larva builds out a long perch in continuation of the mid-rib of the leaf on which it rests. It collects a little bundle of bits of leaf, etc., at the base of this perch.

*Second stage*.—Head rounded, brown, with two paler lines in front converging toward the vertex. It is roughly tuberculate, the tubercles yellowish. Width .9 mm. Body densely tuberculate, each tubercle with several points, beside many minute granulations. General colour dark brown, with a broad, dull ochre, dorsal patch, which widens on joints 3-5 and 8-10. The larva rests on its perch as in the first stage.

*Third stage*.—Head bilobed, bulging in front, very rough and tuberculated, but the tubercles are not large. Colour nearly black, the clypeus and tubercles paler, the latter tipped with yellowish on the sides

of the head. Width 1.3 mm. Body rough and tuberculated, a pair of short subdorsal tuberculated processes on each joint except joint 2, those on joints 3, 12 and 13 the largest, those on joints 4, 6 and 11 next in size, the others all smaller; other similar smaller tubercles in a double dorsal line and two lateral lines, besides numerous small granulations. Colour black with a dorsal white patch on joints 8-10, reaching down the sides on joint 9. All the tubercles and granulations are dull yellowish, more especially on joints 2-4. The larva builds no perch in this stage.

*Fourth stage.*—Head as before, densely tuberculate, the tubercles larger laterally and especially so at the vertex. Colour blackish-brown, darker centrally, the tubercles pale. Width 1.8 mm. On the body are a series of round wart-like prominences covered with tubercles, the subdorsal ones on joint 3 produced into a pair of horns 1 mm. long, while those on joints 4, 11, 12 and 13 are larger than the others. Body densely tuberculate, black with a dorsal white patch as before. All the tubercles are pale brown. Some dorsal cream coloured shades on joints 3 and 4 and a black dorsal dot on joints 8 and 9 each. Indications of a white substigmatal band, especially on joints 11-13.

*Fifth stage.*—Head bilobed, the apices produced, rough and tuberculated as if covered with warts, higher than wide and depressed along the median suture. Colour dull olive-brown, the excrescence paler; ocelli black; mouth dark. Width 2.8 mm. The body is enlarged dorsally at joints 3, 4 and 6; on joint 3 is a pair of subdorsal horns, roughly tuberculated, 2 mm. long. On joints 4, 6, 11, 12 and 13 are small subdorsal tubercles, the largest on joint 13, and close together. A number of small, round, smooth, elevated bluish dots, most conspicuous dorsally on joints 5-7 and 11-13. General colour olive-brown, shading into pale pinkish on joints 2-4, but still partly mottled with the ground colour. On the hump on joint 6 it is pale olive-yellow, except in a dorsal band where the ground colour prevails. A large patch, nearly white on joints 8-10 dorsally, but on joint 8 posteriorly and joint 9 laterally, it contains a few streaks of the ground colour. An irregular, broad, white, substigmatal band on joints 5-13. Spiracles black, pale centrally and encircled by white. The processes on joint 3 and tubercles on joint 13 are blackish-brown; venter mottled with whitish with a medio-ventral nearly white line.

Anal feet elevated in repose and the body humped, the head turned to one side. The larva usually rests on the stems of its food-plant.

*Chrysalis*.—Eye cases prominent, pointed, thorax keeled; wing cases very large, projecting; on the anterior part of the abdomen dorsally, is a very large circular disk-like projection, its sides somewhat creased. Abdomen tapering, the last segments rounded. Cremaster large, flat, fastened by its numerous hooks in the mat of silk spun by the larva and from which the pupa is suspended. Wing cases and abdominal hump subtranslucent dark olive-gray; thorax dull purplish, mottled with white; abdomen nearly all sordid white but shaded with gray and black dorsally, laterally and in a double broad ventral band. The terminal segments and cremaster are entirely black. Length 25 mm.; thickness through thorax 7 mm.; height of abdominal projection 3 mm.; greatest width through wing cases 8 mm.

*Food-plants*. — Willow (*Salix*), poplar (*Populus*), choke-cherry (*Prunus demissa*).

The second brood of larvæ probably hibernate in the second stage in the manner usual in *Limenitis*.

#### ENTOMOLOGICAL FIELD DAY.\*

July 4th was a great field day for the entomologists, it having been arranged to meet at Jamesburg, N. J. The societies represented were the Entomological Section of the Academy of Natural Sciences of Philadelphia, the Entomological Society of Philadelphia, the Feldman Collecting Social of Philadelphia, the Brooklyn Entomological Society and the Newark Entomological Society. About forty members were present, among whom were Dr. Henry Skinner, Curator of the Entomological Society of Philadelphia and editor of the Entomological News; Professor J. B. Smith, of New Brunswick; Isaac C. Martindale, of Camden; James Johnson, of Frankford; William J. Fox, Assistant Librarian of the Academy of Natural Sciences; C. W. Johnson, Curator of the Wagner Institute; Dr. Castle, Messrs. Liebeck, Neutze, E. Wenzel, H. Wenzel, Schmitz, Trescher, Hoyer, Bruner, Philip Nell and Philip Laurent, of Philadelphia, and Messrs. Machesney, Angell, Loeffler, Angelman, Sherman, Thompson, Ottolengin, Leng, Merkel, Roberts, Pearsall, Davis, Baier, Hess, Dietz and Sieb, of Newark, New York and Brooklyn.

\*From the Philadelphia Public Ledger.

It was feared that the hail storm of the previous evening would somewhat interfere with the pleasures of the day, but the bright sunshine of the early morning brought sunshine into the hearts of the ardent collectors, for Jamesburg is well known to be a favourite collecting ground. The arrangements for the occasion were made by Prof. J. B. Smith, State Entomologist for New Jersey. The party were met at the Jamesburg Station by the gentleman having charge of the extensive cranberry interests near the town, and by conveyances were taken about a mile to a beautiful grove, bordering cranberry meadows, where, after a photographer had secured a picture of the entire party, the day was spent in collecting, ample lunch having been provided. The locality proved to be such that all the divisions of entomological study could be enjoyed. Philip Nell gave his whole attention to Micro-lepidoptera, C. W. Johnson collected the Diptera, W. J. Fox looked after Hymenoptera, a few collected in all the orders, quite a number looked after butterflies and moths (Lepidoptera) exclusively, while, perhaps, the greater portion collected the Coleoptera. Isaac C. Martindale succeeded in making the largest collection of the day of butterflies and moths, as well as a large number of dragon flies (Neuroptera), which seemed to be quite abundant. No complete list of all the collection has yet been made, but the following butterflies were taken:—*Papilio troilus*, *Papilio phileas*, *Colias philodice* and *alba*, *Pieris rapae*, *Danaus archippus*, *Melitæa tharos*, *Argynnis idalia*, *cybele* and *myrina*, *Hypophleas Americana*, *Lycæna comyntas*, *Thecla calanus* and *titus*, *Neonympha canthus* and *eurytis*, *Eudamus tityrus* and *bathyllus*, *Satyrus alope*, variety *maritima*, *Pamphila masasoit*, *manataagua*, *verna*, *pontiac* and *metacomet*, which may be considered as a remarkably good catch for one day in one locality. The specimens were in fine condition, and some of them of rare occurrence. The best catch by the coleopterists was the *Cicindela lepida*, a beetle heretofore known only from the seacoast and the vicinity of the salt licks of Illinois.

The State of New Jersey has long been regarded as a good collecting ground for the naturalist in whatever department his studies inclined, and the finding now and then of these rare species in unlooked-for localities adds to her well-known reputation. Professor Smith has given much attention to the insects found to be injurious to the agricultural interests, and has greatly aided the farmer in ridding the farm and the growing crops of destructive things. The cranberry culture has received his



special attention, and his knowledge of entomology has been of great service to cranberry growers. The bogs near Jamesburg are looked upon as being the finest in the State, and the prospect this year is very favourable for a good crop. The berries are just now forming; the inflorescence having been in great profusion. Mr. Martindale identified all the plants that were collected, he having been engaged in botanical study for more than thirty years, and has become familiar with all the species growing in the State. He stated that a belt of country crossing New Jersey diagonally, from Sandy Hook on the coast to near the city of Salem on the Delaware river side, in width about twenty miles, known as the pine barren regions, was the best botanical ground to be found east of the Alleghenies. Many entomologists have not heretofore given sufficient attention to botanical study, but it is now well known that many species of insects feed exclusively on certain plants, and a knowledge of these aids much in the determination of the collector's gatherings.

The Geological Survey of New Jersey, so long in charge of the late Professor Cook, has already published catalogues of the fauna and flora of the State, but there yet remains much desirable work to be done by the careful collector. The late Dr. Joseph Leidy, of Philadelphia, regarded the swamps of New Jersey as the best collecting ground east of the Mississippi Valley, and during the preparation of his memorable work on the Fresh Water Rhizopods made many and frequent visits thither, and thereby greatly enlarged our knowledge of species. The late Chas. F. Parker, of Camden, in company with Mr. Martindale and others, explored all that part of the State lying south of Trenton for botanical specimens. Mr. Martindale has collected the marine flora (sea mosses), and already published the results of his years of study in that department. Mr. Calvert, of Philadelphia, has completed a list of all the dragon flies known to this section. Dr. Henry Skinner has published a list of the butterflies that have been found in the vicinity of Philadelphia. All these greatly aid the student of natural history, and the annual field gatherings of the active entomologists are doing a good work in fostering a more social feeling among the many persons engaged in the study of insect life. No special arrangements were determined upon for another year, but it is expected that the annual gatherings will be continued, and all persons interested are privileged to attend. It was much regretted that Dr. Horn, the eminent entomologist of Philadelphia, was prevented by previous engagements from being with the party.

ENTOMOLOGICAL AND OTHER MEETINGS AT  
WASHINGTON.

The annual programme of the American Association for the Advancement of Science has just been issued. For a fortnight continuously meetings of great scientific interest will be held in Washington. In the whole of America there is no place which can compare with the American capital as a suitable place for such meetings. Not only is it the social and political centre of the Union, but here also are the headquarters of the various government scientific departments. To naturalists objects of great attraction will be the Smithsonian Institution, the National Museum, the Aquarium, the Botanical Gardens, National Zoological Gardens, and many other places of general interest. Several other scientific bodies have arranged to hold their meetings previous to the meetings of the American Association. The American Microscopical Society, Aug. 11-12. The Association of American Agricultural Colleges and Experiment Stations will meet Aug. 12 in the Law Lecture Room of Columbia University. On Aug. 13th the Association of Official Agricultural Chemists will begin its sessions, and a conference of American Chemists will be held on the 17th or 18th. On Monday, 17th, the Society for the Promotion of Agricultural Science will hold its first meeting, and also on the same day the Association of Economic Entomologists, of which our own Vice-President, Mr. James Fletcher, of Ottawa, is the presiding officer for this year. The Entomological Club of the American Association will meet on Aug. 19th. A joint circular has been issued by Mr. Fletcher and Prof. Osborn, President of the Entomological Club, urging entomologists to attend the meetings, and suggesting that papers referring especially to economic entomology might, for convenience, be best presented before the Association, while notes, items, discoveries of scientific interest, etc., might be referred to the Club, and authors are requested to send in beforehand titles of their papers to the proper secretaries, viz.:—

Mr. L. O. Howard, Secretary Association of Economic Entomologists, Washington, D.C.

Dr. C. M. Weed, Secretary Entomological Club, A.A.A.S., Hanover, New Hampshire.

This arrangement, we feel sure, will tend to make both of these meetings more successful, and will allow Entomologists attending to be present at all the sessions of both organizations.

Meetings of the Entomological and Botanical Clubs of the American Association will be held throughout the week.

On the whole the coming meeting of the American Association at Washington promises to be one of the most profitable and enjoyable of any ever held under the auspices of that most successful body.

### CORRESPONDENCE.

#### THOUGHTS ON SPECIES.

*Sir*,—In considering the value of the structure of genitalia in determining species, we come in direct collision with the old unsettled question, "What constitutes a species?" I believe it to be a simple one, when we remember that there are two ways of using the term, the natural and the artificial. All are agreed that there is no such a thing as genera in nature, and I am fully convinced that there is such a thing as species in nature, which is satisfactorily demonstrated by cross breeding; and that the artificial method of defining species is merely a matter of individual opinion, as to how much difference should be considered enough to make a species. Does the fact stated by Prof. Smith, that "in an entire genus all the species will be practically alike," prove that the character has failed? May it not rather go to show that genus to be composed of just so many artificial species, of one natural species, which I am quite satisfied may often be the case, and, therefore, be a valuable proof of its success?

There are no two opinions of the advantage to be obtained from a reliable test of species. Prof. Smith expresses confidence in the genitalia up to a certain point; given his experience, we might have the same. One of his published investigations convinced me that there must be a great deal in it.

In *Entomologica Americana* for August, 1890, dealing with the *Scopelosomas*, he says, "*Moffatiana* is closely allied in colour and maculation to *Grafiana*, so closely, indeed, that for a long time they were considered identical. \* \* \* The genitalia of *Moffatiana* are of an entirely different type from the other species of the group. \* \* \* This strong difference in species otherwise so nearly allied is remarkable." As I know the history of how they came to be separated, I will give it as confirmatory evidence to the value of that method.

In that famous entomological year, 1877, I took *Scopelosomas* for the first time; they were in great abundance. From the latter part of September to the first day of December I took about 800 moths, mostly *Scopelosoma* and *Lithophane*, the bulk of the *Scops.* being of that form now known as *Moffatiana*. I had noticed a difference in the depth of shading in the yellow ones, but thought it the result of age and exposure.

In November I visited Mr. Grote in Buffalo, taking with me representatives of my recent captures, and received from him over a dozen names of *Scops.* and *Liths.*, and amongst them *S. Graefiana*. In following years I observed that the yellowish form was just as fresh as the reddish one, and that in some localities one would greatly outnumber the other, and I began to suspect that we might have in these forms different moths. About this time Roland Thaxter, who is now, I understand, entitled to the prefix of Dr., opened communication with me, with a view to exchange; to him I expressed my suspicion, and sent to him an example of the light form as being least abundant with me, and received the reply, that he saw no difference in it from those he took. I then sent him the reddish form; he expressed delight, never having seen the same before, and enquired if Mr. Grote had seen it. I told him that I had got the name from just such specimens.

I supplied him with a good series, and he went into communication with Mr. Grote about it, and it seems with some difficulty succeeded in persuading Mr. Grote that it was deserving of a separate name. And now Prof. Smith, by the examination of the genitalia, finds them widely apart. I, by observing their habits, had suspected this might be the case, but could not prove it, whilst from appearance alone Mr. Grote had failed even to suspect it.

As resemblance is not always proof that they are one, so the lack of it is not a demonstration that they are separate. In the early part of 1890 I had an opportunity of examining an extensive series of *Lithophanes* in the collection of Capt. Geddes, Toronto. I could arrange in line 30 or 40 *Disposita*, *Petulca*, *Ferrealis*, *Signosa*, *Bethunei*, in such a way as to make it appear impossible to tell where the separation should be made. What verdict would the genitalia give in this case? I would expect it to be in favour of their being artificial species of one natural species; yet it may not, but suppose it did? let no one think that I would favour the obliterating of a single name.

J. ALSTON MOFFAT.

## BOOK NOTICE.

INSECTS AND INSECTICIDES, by Clarence M. Weed, Hanover, N. H., 1891.

Under the above caption Dr. Weed has published a small volume of 281 pages, well printed and copiously illustrated, which will be found most useful by those for whom it is prepared—the farmer, the fruit grower, the floriculturist, and the housekeeper. The work consists of an introduction and six parts. The introduction gives a concise account of the transformations of insects, which are illustrated by the life history of *Papilio asterias*, the Celery Caterpillar, for those which have a complete metamorphosis, and the Chinch Bug for those which pass through incomplete transformations. The differences between biting and sucking insects are explained, and the natural enemies of injurious insects are treated of. There is then a summary of the different insecticides, and the best methods of applying them. The introduction closes with short instructions for collecting and preserving insects.

*Part I.* treats of Insects Affecting the Larger Fruits—apple, plum, pear, cherry, peach.

*Part II.*—Insects Affecting Small Fruits—strawberry, currants, gooseberries, raspberry, blackberry and grape.

*Part III.*—Insects Affecting Shade trees, the Rose and House Flowers.

(Parts 1-3 of Dr. Weed's work have appeared previously in a small edition issued by the Columbus (Ohio) Horticultural Society.)

*Part IV.*—Insects Affecting Vegetables—tomatoes, potatoes, celery, squash, cucumber, bean, pea, cabbage, onion, asparagus and rhubarb.

*Part V.*—Insects Affecting Cereals and Forage Crops—Indian corn, wheat, clover, grass.

*Part VI.*—Insect Pests of Domestic Animals and the Household.

On the whole this is a very useful and attractive volume, well arranged, easy of reference, and well illustrated. The accuracy and quality of Dr. Weed's scientific work are now too well known to need any comment, further than to say that this his last publication is up to his usual excellent standard.

J. F.

Mailed August 6th.

